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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LAM, CATHY FONG FONG	

ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 05/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/816,132	BRIST ET AL.	
	Examiner	Art Unit	
	Cathy Lam	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18 and 30-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18, 30-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

In view of the amendment and remarks filed on February 21st 2006, the pending claims continue to be unpatentable as following:

Claim Objections

1. Claim 10 is objected to because of the following informalities: applicant is suggested to change "thermochromatic layer *comprises* an activation temperature" to – thermochromatic layer has an activation temperature --. Appropriate correction is required.

Claim Rejections - 35 USC § 102

1. Claims 1, 2, 9 and 30-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Arnaud et al (US 6872453).

Arnaud discloses a thermochromatic coated layer comprised of a substrate having a conductive layer and a thermochromatic layer. Optionally, a glass or another layer may be included (col 6 L 54-56 & col 7 L 1-4).

The thermochromatic layer has an activation temperature from 30 to 40 °C (i.e. 86-104°F) (col 6 L 41-47).

The examiner takes the position that the substrate having a conductive layer resembles a printed circuit board since the conductive layer is connected to an electrical supply (col 6 L 1-6, L 51-55). The thermochromictic layer has optical properties, is turned on by electrical control (or electrical supply) (col 6 L 36-40).

2. Claims 1-2 , 6, 9-13, 30-31 and 34 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Larson (US 6229514).

Larson discloses a display comprised of a substrate (10), electrode patterns (4,5) and a visualization medium (8); all in the named order.

The visualization medium (8) is temperature sensitive and changes color upon heating of the electrodes (col 5 L 10-17). The electrodes are connected to control units (e.g. integrated driving circuits) (col 4 L 49-53). The visualization medium transforms a spot heat to a visible dot (9), the examiner takes the position that this is analogous to the identification markings as stated in claim 9.

The examiner takes the position that the electrodes on the substrate resembles a printed circuit board and the visualization medium resembles the thermochromatic coating. The thermochromic coating is opaque at room temperature but becomes transparent when heated (col 6 L25-29). The thermochromatic material can be a liquid crystal material (col 6 L 30-33).

3. Claims 1-3, 6, 9-13,17-18, 30-31 and 38 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Parker (US 4922242).

Parker discloses a thermochromatic material coated substrate comprised of electrodes, a pigment layer, a transparent substrate, a mask and a thermochromatic material.

Electrodes (122,122') are formed onto both surfaces of the substrate (121) wherein the substrate is a resistive element (col 3 L 3-34). A mask (7) having a cutout pattern is placed adjacent to the first surface of the substrate (col 2 L 64-68). The thermochromatic material is applied to the second surface of the substrate (Fig. 2). Such that from Fig. 2, the thermochromatic material is placed below the mask (7).

The thermochromatic material can be a liquid crystal (col 5 L 21-23). At the transition temperature, the thermochromatic material changes from opaque white to transparent (col 5 L 38-39).

The examiner takes the position that the electrodes on the resistive element is equivalent to a printed circuit board and the electrodes resemble the signal layer. Also, the examiner takes the position that the thermochromatic material is integrated with the mask layer (7).

Claim Rejections - 35 USC § 103

4. Claims 1-18 and 30-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parker (US 4922242) or Arnaud et al (US 6872453) or Larson (US 6229514) in view of Rait (US 6880396).

Parker, Arnaud and Larson all teach an electronic device having a liquid crystal thermochromatic material coated over the device.

The prior art references however do not teach the solder mask is transparent as in claim 8, nor do they teach the particular arrangement as in claim 16. The prior art also do not teach the thermochromatic material can be a leucodye or an N-isopropylacrylamide compound.

Rait teaches a liquid level indicator which is used for monitoring the amount of liquid in a container.

The liquid level indicator is a leucodye ink which is a thermochromatic material that exhibits vivid color changes with slight changes in temperature. The leucodye ink is to replace the conventional liquid crystal thermochromatic material (col 4 L 51-67).

In view of the prior art teachings, one skill in the art would changes the arrangement to his desire and choose leucodye ink, liquid crystal or N-isopropylacrylamide as a thermochromatic material because the arrangement can be modify according to one's desire and these claimed thermochromatic materials are conventional heat sensitive color transforming.

Regarding to the thermochromatic material that is to indicate an area of the carrier substrate that is above an operative temperature caused by a dissipation of heat from the heat generating component. The examiner takes the position that this is a functional limitation which does not further limit the thermochromatic material nor changing the chemical or physical aspect of the thermochromatic material.

Response to Arguments

5. Applicant's arguments filed on Feb. 21st 2006 have been fully considered but they are not persuasive. Applicant in the remarks raises the following issues:

A. Arnoud's thermochromatic layer which placed over a substrate and a conductive layer, is to switch the reflective/absorbent state of the solar panel.

Arnaud fails to disclose a normal operating temperature. The conductive layer is specifically designed to achieve temperatures high enough to switch the reflective/absorbent state in order to function as intended.

B. Larson's display device consisting of electrodes on a substrate. When electrode is turned off, it is at room temperature and not operating, only when the electrode is turned on it operates, thus the activation temperature of the thermochromic material is below the electrode's normal operating temperature.

C. Parker's display device having a thermochromatic material and a resistive element, which operates when turned on, and achieves a temperature above the activation temperature.

Also, Parker's resistive element exhibits PTC behavior and does not overheat, therefore the resistor is at normal operating temperature when turned on.

D. Rait fails to disclose all the limitations of the independent claims. The motivation to combine Rait with Parker, Arnaud and Larson is unclear.

In respond to the above issues:

A. Arnaud teaches a heat source (or a heat generating component) connecting to the conducting layer and thermochromatic layer. Arnaud teaches that one can choose a "switching temperature" for a visible change of the thermochromatic layer (col 3 L 20-24). This "switching temperature", the examiner here is taking it as the activation temperature.

Arnaud implicitly states that the visible changes of the thermochromatic layer is caused by a signal initialing the switching (col 6 L 31-33).

B. Applicant's arguments regarding to the thermochromatic material is below the electrode's normal operating temperature, is unclear and provides not factual basis.

The thermochromic material is used for detecting overheated components in a printed wring board having electronic components or devices. It is common sense that when the electrode (or the electronic device) is turned off, the thermochromatic layer (or material) would not be "in use" or it would just be an idle layer. Even if the electrodes

are turned on, the thermochromatic layer may not have an visible change, if the temperature has not reached to the predetermined color changing temperature.

C. Parker's thermochromatic material undergoes a reversible and visually observable change in response to the selective generation of heat in the resistive element (col 3 L 31-34). The examiner is taking the position that the "selective generation of heat" here is referring to the claimed activation temperature.

The resistor or any electrical components may or may not be overheated in the prior art. The presence of a thermochromatic layer (or material) is a safety warning to indicate any overheating. The fact that the prior art resistor (or electrical components) are not turned on (or not over heated) does not mean the thermochromatic layer would lose its function, nor does it mean the thermochromatic layer has no activation temperature.

The three prior art clearly meet the concept of the present invention.

D. Rait was used to show that Leucodye ink is a known thermochromatic material.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Cathy Lam
Primary Examiner
Art Unit 1775

cfl
April 28, 2006